

REMARKS

Claims 18, 26, 27 and 29-33 are pending in the application. New claims 35 and 36 are added which are respectively dependent from claims 26 and 33. Claims 26 and 33 are the independent claims of the application and these claims have been amended.

Claims 27, 29, 30, 32 and 33 are rejected under 35 USC §103 as being unpatentable over Gilboa, U.S. 2002/0193686 in view of Werp, U.S. 6,015,414. Claims 18, 26 and 31 are rejected as being unpatentable over Gilboa in view of Werp and further in view of Strommer, et al., U.S. 2001/0031919.

Regarding independent claim 33, which is rejected over Gilboa in view of Werp, the Examiner acknowledges that Gilboa fails to explicitly teach at least one corrective movement when the orientation does not match the slope of the path at a certain location. Werp is relied on to teach this feature, with reference to Fig. 4 of Werp.

Applicant respectfully traverses this rejection. Applicant submits that the corrective movement of Werp does not teach the corrective movement of the present application as set forth in claim 33 wherein the catheter is retreated backward within the lumen system. Fig. 4 of Werp shows vector correction of a movement of the catheter tip for the next step of the catheter tip, when the catheter tip advances to a position not in accordance with a planned path. As Werp states at column 5, line 65 – column 6, line 24:

Referring to FIG. 4, corrections are made in accordance with a feedback/lag model. . . . the direction of V_{step} is constrained to vary from move to move in a manner so that sudden changes in V_{step} result in a path having a specified minimum radius of curvature or a less curved trajectory. . . .

Also, Werp (at column 3, lines 44-46) discusses “controlling movement of a catheter through a medium, in which a flexible catheter . . . is pushed through a medium”, where the corrective movement of the catheter employs vector correction. The “medium” can be the brain.

On the other hand, the present application presents guiding a catheter through a lumen system of a body of a patient, for example, blood vessels. It should be clear that guiding a catheter through a medium, such as the brain in Werp, is different than through a blood vessel, as in the present application.

Guiding a catheter through a blood vessel presents additional constraints due to risk of harming the blood vessel (e.g., artery perforation). Therefore, a simple vector corrective movement such as used in Werp is not applicable in guiding through blood vessels. The invention of the application presents a different corrective movement. This movement is such that when the catheter tip's advancement does not match the displacement of the catheter itself, then the catheter is directed to retreat backward. Also, as set forth in new claim 36, the catheter tip directed to twist in order to maneuver the catheter tip to overcome an obstacle. This is described in the present application at page 19:

Controller 104 determines the advancement of the distal portion of catheter 116 at each time increment . . . and checks whether this advancement substantially matches the predetermined displacement by which catheter 116 was supposed to advance. In case the actual detected advancement does not match the predetermined displacement increment, controller 104 determines that catheter 116 has made contact with an obstacle . . . which prevents catheter 116 to advance according to path 128 (e.g., the distal portion of catheter 116 can be stuck at a bifurcation 142).

In this case, controller 104 sends a signal to moving mechanism 106 to retreat catheter 116 by a selected increment backward within lumen 118 and also to twist the distal portion of catheter 116 by a selected amount. After this twist, controller 104 sends a signal to moving mechanism 106 to advance catheter 116 by a predetermined displacement increment. thus, moving mechanism 106 can maneuver catheter 116 to over come the obstacle and to enter the predetermined branch (in this case the thyrocervical trunk at bifurcation 142). [emphasis added]

Werp does not teach the corrective retreating backward movement of the present application. Werp does not teach the twist of claim 36. Even if a person skilled in the art would

have modified Gilboa to include the correction procedure of Werp, he would not have learned or achieved the corrective movement of the present application.

Claim 33 of the application has been amended to include this type of corrective movement with a backward increment. Since the combination of Gilboa and Werp neither teaches nor suggests this novel and advantageous feature, claim 33 should be allowable.

Claims 18, 27, 29, 30, 31 and 32 are dependent from claim 33. New claim 36 has been discussed above. In view of the above discussion regarding the corrective movement of Werp, and in view of the amendment to claim 33, which makes it allowable, these claims also should be allowable.

Claim 26 also has been amended to recite the backward corrective movement discussed above. As discussed above regarding claim 33, Werp does not teach a retreating backward corrective movement. Thus, even if a person skilled in the art would have modified Gilboa to include the correction procedure of Werp, he would not have learned or achieved the corrective movement of claim 26. The addition of Stommer also does not teach the corrective movement of the present application as set forth in claim 26.

New claim 35 depends from claim 26 and adds the twist to the corrective movement. As discussed above, this is neither taught nor suggested in the cited art. Accordingly, claim 26 and its dependent claims 18 and 35 also are patentable and should be allowed. Claim 31 depends from claim 33 and also should be allowed.

In view of the above discussion amended claim 26 and its dependent claims also are patentable and should be allowed.

New claims 35 and 36 are respectively dependent from claims 26 and 33. In view of the allowability of independent claims 26 and 33, these new dependent claims which add further novelty to the invention also are patentable.

Prompt and favorable action is requested.

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